

Preston Hudlow

GEOG 419

Tom Allen

Lab 7

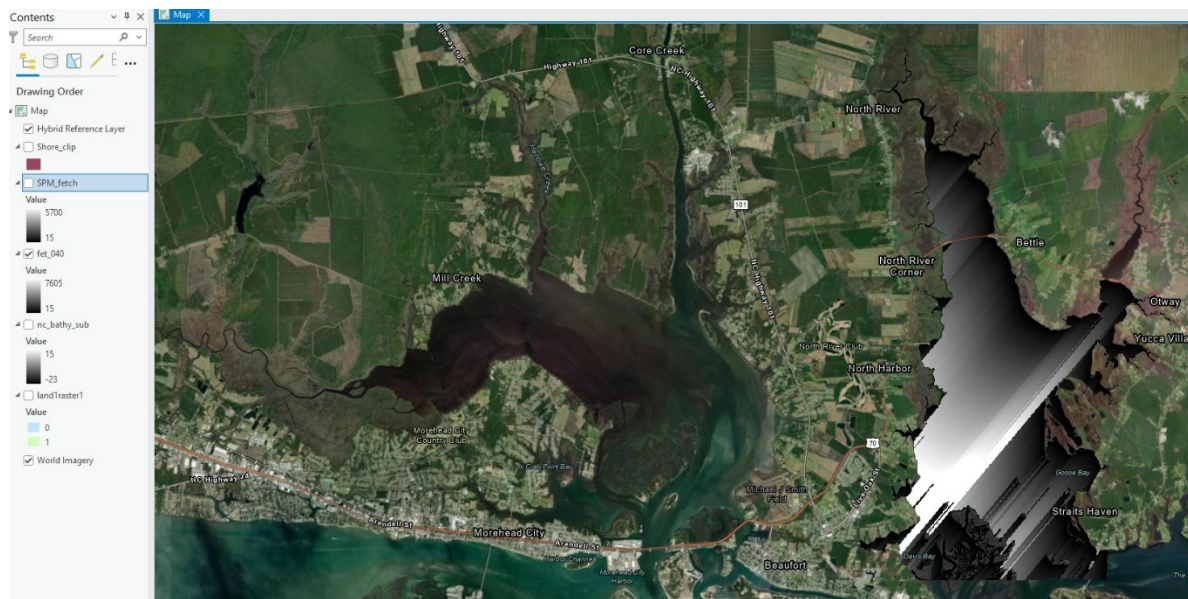
Q1: Use the ArcMap Identify tool to verify the values for land: ____ and water: _____. Are there any other values in the raster layer?

- Land: 1
- Water: 0
- No there are only two values in the raster layer.

Q2: What is the exact direction in the file dir_40.txt? _____ degrees and what type of wind event would this emulate? (e.g., sea breeze, nor'easter, tropical storm?)

- 40 degrees from the northeast.
- Type of wind event: Likely a nor'easter

Q3: Screenshot your SINGLE 40degree fetch result calculation into your answer document. Where in the North River study area are the highest and lowest fetches based on this analysis? What are the units of fetch?



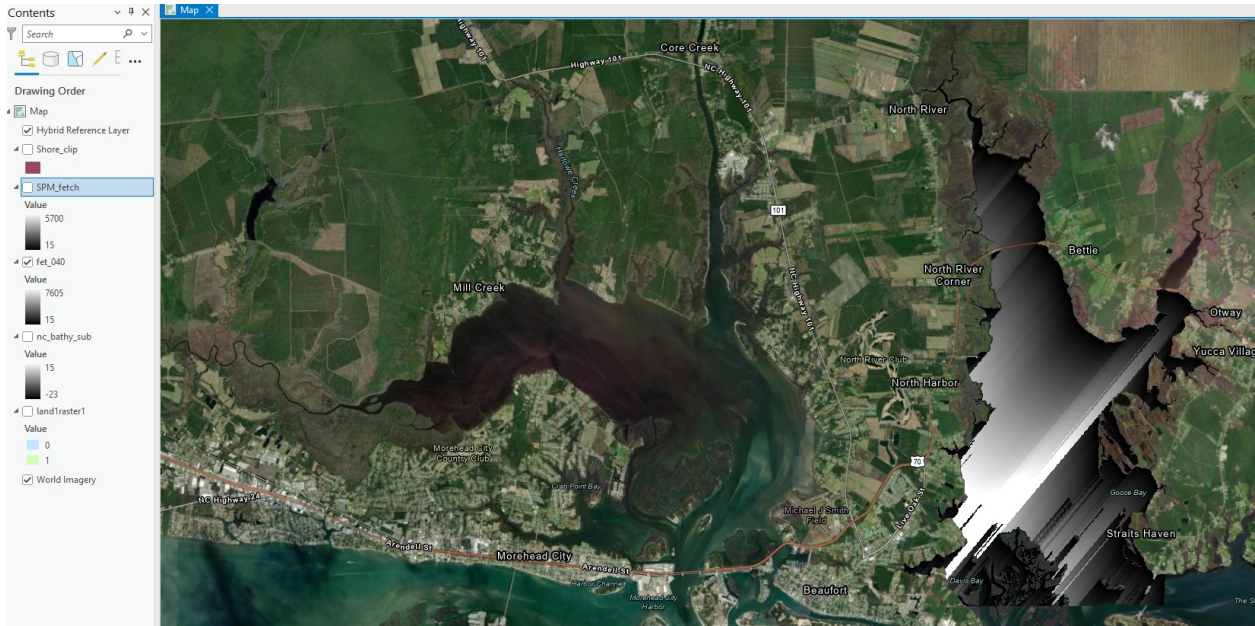
- From the study area in the southwest there are the highest numbers of fetch. In both the southeast and northeast, the fetch numbers are reduced.
- The units of fetch are measured in distance shown in meters

Q4: Does the SINGLE fetch model characterize potential wave refraction? Explain why or why not.

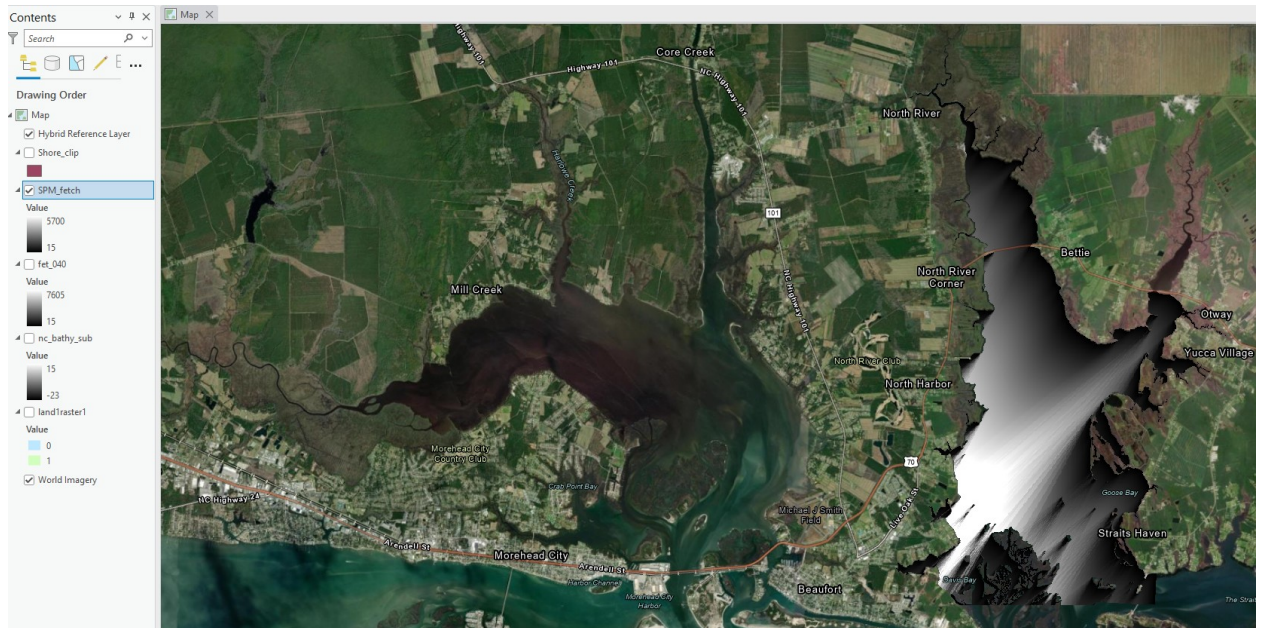
- No, the SINGLE fetch model does not characterize potential wave refraction. The SINGLE fetch model assumes a straight-line path over water from a given wind direction and only calculates the maximum uninterrupted distance.

Q5: Make a set of screenshots or map layout that shows all 3 derived fetch calculations (single, SPM and SPM-Restricted.) Use the same symbology so that results are comparable. Annotate to show you can interpret the output.

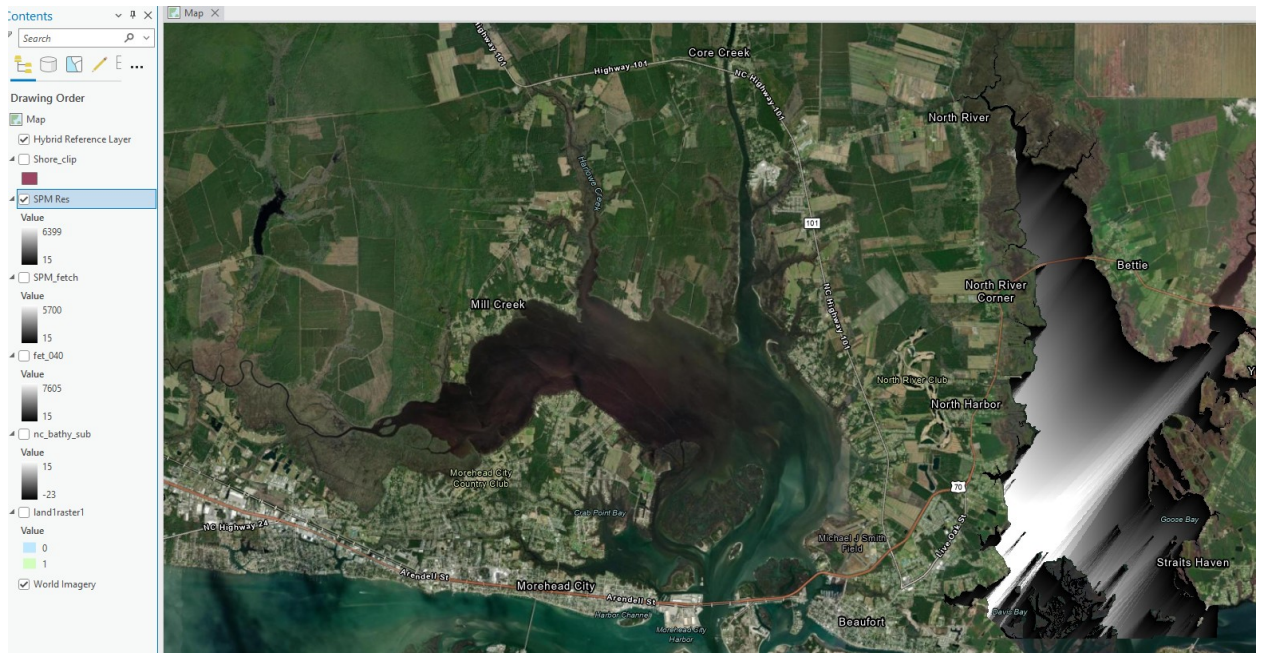
- Single



- SPM-



- SPM restricted

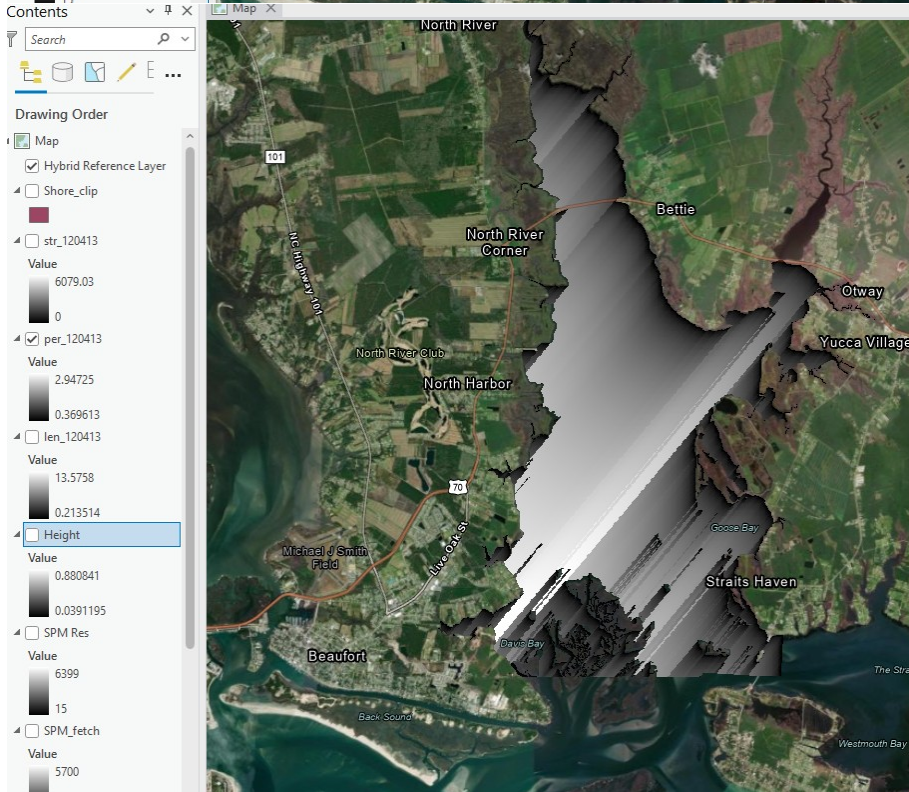
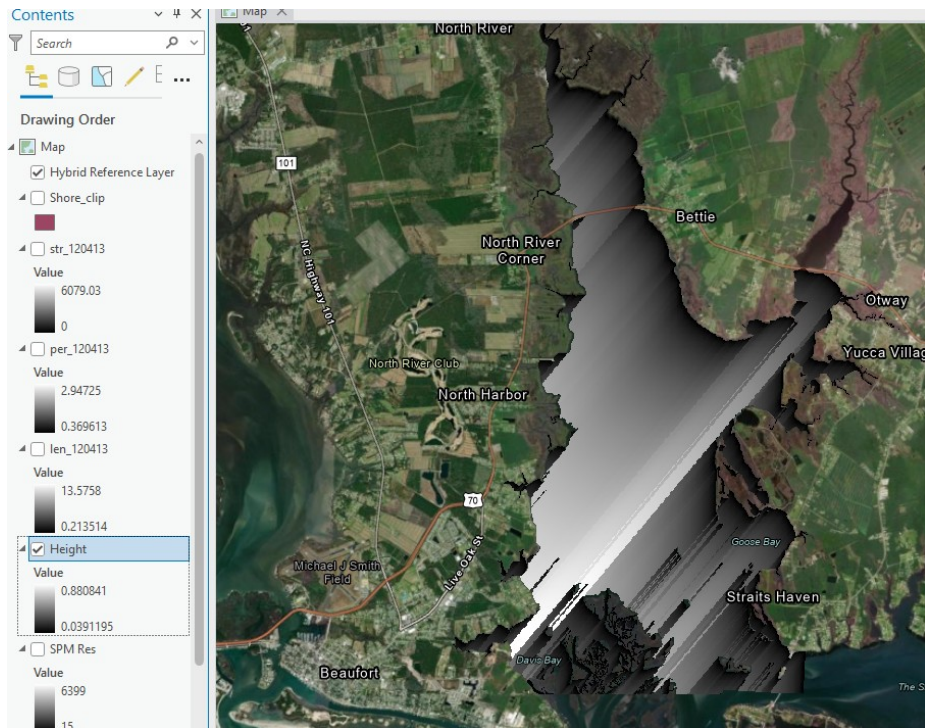


Q6: Compare and contrast the results of three derived fetch calculations: 1) Single, 2) SPM, and 3) SPM Restricted. Explain why each method may have a particular strength or weakness and which method/s which could be useful to generalized fetch and openness/wave exposure applications, even though the fetch algorithm does not calculate wave height, energy, or characterize wave refraction or diffusion. (1 paragraph)

The Single fetch model uses one straight line and is easy to compute but oversimplifies wave exposure. The SPM method improves accuracy by averaging fetch over multiple angles, better reflecting real wave directions. SPM Restricted further refines this by excluding directions

blocked by land, making it more realistic in complex coastlines. While none account for wave height or refraction, SPM and SPM Restricted are more useful for estimating general wave exposure and coastal openness.

Q7-8: Report your wave analysis results, including wave height, period, and shear stress or suspension (include sample screenshots and any helpful annotation/interpretation answ



Analyzing the wave height and period it coincides with the original fetch analysis. The waves are under a meter in height with a low period maxing around 2.9.

Q9-10: How do the results for wave model height compare across the North River to your fetch and single (manual) point of analysis? Explain.

The wave model shows low wave heights (under 1 meter) and short periods (up to 2.9 seconds), which align with the fetch and single-point analysis indicating limited wave development. Across the North River, wave heights remain small due to the short fetch distances and land obstruction, confirming that the limited fetch restricts energy buildup. This supports the conclusion that the area is relatively sheltered, and wave exposure is low, consistent with both manual and model-based fetch assessments.